



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,962	02/01/2001	Brian Edward Causton	08935-238001 / M-4952	6298
26161	7590	01/21/2004		
FISH & RICHARDSON PC 225 FRANKLIN ST BOSTON, MA 02110				

EXAMINER
DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 01/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/773,962

Applicant(s)

CAUSTON ET AL.

Examiner

Tracy Dove

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,6,8-14,16,19,21-26,29-34,36-61,63-68 and 70-72 is/are pending in the application.
- 4a) Of the above claim(s) 41-50,55-61 and 63-67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8-14,16,19,21-26,29-34,36-40,51-54,68 and 70-72 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the communication filed on 11/24/03. Applicant's arguments have been considered, but are not persuasive. Claims 1-3, 5, 6, 8-14, 16, 19, 21-26, 29-34, 36-61, 63-68 and 70-72 are pending. Claims 4, 7, 15, 17, 18, 20, 27, 28, 35, 62 and 69 have been canceled. Claims 41-50, 55-61 and 63-67 have been withdrawn as being directed to a nonelected invention.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/24/03 has been entered.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 11/24/03 is a duplicate copy of the IDS submitted on 6/4/01, which has been completely considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 51 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1745

Claim 51 recites the limitation "the flux". There is insufficient antecedent basis for this limitation in the claim. The claim should be amended to recite "the second flux is elongated".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 2, 5, 6, 8-11, 51 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by Adey et al., US 6,284,400 B1.

Adey teaches a metal-air cell having one or more air entry ports located in the bottom of the cathode can to provide for entry of oxygen-rich air into the cathode can. The air ports are distributed over the bottom of the cathode can, opposite the reaction surface of the cathode assembly. See abstract. Figure 1 shows a zinc-air cell (button cell) having a housing containing an anode can 12 electrically insulated from a cathode can 14 by a seal 16. Barrier layer 19 (separator) spaces the reactive anode material 31 from the cathode assembly 18 (see col. 6, lines

Art Unit: 1745

31-48). As oxygen enters the port, the oxygen spreads out over substantially the entire reaction surface 54 (of the cathode assembly), supplying necessary cathodic oxygen to the reaction surface. Figure 4 shows the spreading of oxygen over the reaction surface, which was known prior to the invention by Adey. This figure shows a circular flux of gas facilitated by the opening shown in prior art Figure 4. Figures 2 and 5 depict the spreading of oxygen over the reaction surface by the inventive air ports of Adey. As can be seen in Figures 2 and 5, the flux of gas as a whole (second flux) facilitated by the openings is generally non-circular. See col. 7, lines 40-62. Each of the 7 larger circles in the central portion of Figure 2 represents the outer edge of the imaginary enclosed area 56 of a corresponding plume 58 at the intersection of the plume with the reaction surface of the cathode. The circles are, of course, visually imaginary and thus are not visible on reaction surface 54 (col. 7, lines 49-62). The oxygen, of course, diffuses throughout the air reservoir to reach all areas of the entire reaction surface (first fluxes of gas overlap) (col. 7, lines 63-col. 8, lines 3). As can be clearly seen in the figures, the openings are not louvers and are symmetrical. The ports are preferably evenly spaced with respect to each other (col. 3, lines 18-20). Adey discusses the port size with respect to diameter, implying a circular port opening, which is preferred. However, any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. While some modest adaptation of Adey would be suggested by different port shapes, the same principles apply to such divergent shapes. In general, ports in the cathode cans range in size from anything greater than zero up to about 0.017 inch (greater than 0 to 0.43 mm). See col. 14, lines 8-17. Table 1 discloses that the number of ports may be 1-13 and Figure 2 shows seven openings in the cathode can defining rows.

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 12-14, 16, 19, 21-26, 29-34, 36-40, 53, 54, 68 and 70-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adey et al., US 6,284,400, as evidenced by Linden, Handbook of Batteries.

See discussion of Adey above.

Regarding claims 3 and 68, Adey does not explicitly teach that the opening may be in the shape of a rectangle (elongated straight opening) or that the opening provides a flux of gas in a curvilinear shape.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Adey suggests that the opening may have a rectangular shape. Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. While some modest adaptation of Adey would be suggested by different port shapes, the same principles apply to such divergent shapes. Thus, Adey teaches and suggests modifying the disclosure to provide for openings having different shapes. One of skill would find a rectangular shape obvious in view of the teaching of a square shape by Adey. Furthermore, Adey suggests a curvilinear shape because Adey teaches the opening may have any shape such as irregular.

Regarding claims 14, 16, 53 and 70-72 note an aspect ratio of greater than 1 indicates an elongated shape such as a rectangle or an oval. Shapes such as a square or a circle would not have an aspect ratio of greater than 1. Adey teaches an elliptical/oval shape, which is an elongated shape having a curved edge and would inherently have an aspect ratio of greater than 1. Adey does not explicitly teach the claimed aspect ratios. However, Adey teaches at least openings having an aspect ratio greater than 1. Adey suggests that the port/opening size may be varied depending upon the size of the reaction surface. In general, the smaller the area of the reaction surface to be supported by each port, the smaller the port size can be (col. 13, lines 41-50). The specific number of ports and the specific size of the ports, will of course, depend on the size of the cell (reaction surface) and the performance characteristics demanded of the cell (col. 14, lines 1-4). Adey teaches that it is the total area of the ports that is important. Thus, ports having different aspect ratios would have been obvious to one of ordinary skill because, for example, different sized rectangles or ovals can have the same total area. One of skill would be motivated to modify Adey because Adey teaches and suggests that the size of the opening depends upon the size of the cell (reaction surface) and the performance characteristics demanded of the cell.

Regarding claims 12, 13 and 30, Adey does not explicitly teach that the battery is a button cell or a prismatic cell. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the skilled artisan would have known that metal-air cells generally have a button or prismatic shape. This is evidenced by Linden, which teaches metal-air cells may have a button or prismatic shape. A prismatic design is shown in Figure 38.2 of Linden. Linden teaches a button cell is used to

Art Unit: 1745

package a metal-air battery of small size, while a prismatic cell is used to package a metal-air battery of large size (see page 38.7). Thus, the skilled artisan would be motivated to use a button cell or a prismatic cell depending upon the desired size of the cell.

Regarding claim 19, Adey does not explicitly teach an elongated curved opening wherein the opening is not a louver or an ellipse. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have ruled that changes in form or shape are obvious without evidence that the particular shape is significant or is anything more than one of numerous configurations a person or ordinary skill in the art would find obvious. In re Dailey, 149 USPQ 47 (CCPA 1976). Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. One of skill would find the elongated curved opening that is not a louver or an ellipse obvious in view of the teaching by Adey that the openings may have any shape such as an irregular shape.

Response to Arguments

Applicant's arguments filed 10/14/03 have been fully considered but they are not persuasive.

Adey

Applicant argues Adey (Figures 2 and 5) shows a cathode can with openings that provide individual gas fluxes on the cathode wherein the individual gas fluxes do not overlap with each other. Examiner disagrees with Applicant's analysis of the Adey reference. Specifically, each of the 7 larger circles in the central portion of Figure 2 represents the outer edge of the imaginary enclosed area 56 of a corresponding plume 58 at the intersection of the plume with the reaction

Art Unit: 1745

surface of the cathode. Thus, the "imaginary enclosed area 56" does not represent the "flux" of gas, but where the plume of gas from the opening first contacts the reaction surface of the cathode. The circles are, of course, visually imaginary and thus are not visible on reaction surface 54 (col. 7, lines 49-62). The oxygen, of course, diffuses throughout the air reservoir to reach all areas of the entire reaction surface (first fluxes of gas overlap) (col. 7, lines 63-col. 8, lines 3). Thus, individual fluxes of gas from individual openings do overlap each other and form a non-circular second flux of gas.

Regarding at least claim 14, Applicant argues "the aspect ratio of an opening corresponds to the specific shape of the opening". This is not correct because different shaped opening may have the same aspect ratio (a circle and a square both have an aspect ratio of 1). The aspect ratio of an opening corresponds to the length of the opening versus the width of the opening (size). Thus Applicant's arguments are not convincing.

Regarding at least claim 19, Applicant argues that Adey does not suggest an elongated curved opening like that shown in Figure 11. However, claim 19 is not limited to the elongated curved opening shown in Figure 11 of the instant specification. While Adey does not explicitly teach an elongated curved opening wherein the opening is not a louver or an ellipse, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have ruled that changes in form or shape are obvious without evidence that the particular shape is significant or is anything more than one of numerous configurations a person of ordinary skill in the art would find obvious. In re Dailey, 149 USPQ 47 (CCPA 1976). Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. One of skill would find the

Art Unit: 1745

elongated curved opening that is not a louver or an ellipse obvious in view of the teaching by Adey that the openings may have any shape such as an irregular shape.

Oltman

The 35 U.S.C. 102(b) rejection in view of Oltman has been withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).



Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745
January 12, 2004